Experience with Using the MEPAS System in Ukraine

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Goal and Scope. Together with specialists from the USA (Dr. J. Droppo and G. Whealan) and Russia (Dr. V. Eremenko and O. Andreev) the authors participated in a cooperative project of MEPAS computer system adaptation and the creation of its Russian version. The goal of this work is to get experience in using of MEPAS system and to develop American computer technologies in Ukraine. The necessity of such a system for Ukraine is obvious because of radiation contamination of its territories after the Chernobyl accident.

Methods. The MEPAS computer system was studied, including its design, principals of work and use. Techniques for mathematical modeling of contamination distribution in each environment subsystem were explored, including time transformation of the contaminants towards cordons of adjacent natural subsystems.

Results and Conclusions. Main achievements from using the MEPAS system in Ukraine include modeling of processes of radionuclides migration from storage and sites of temporary radioactive waste localization through aeration zone and underground water within Chernobyl Exclusion Zone and within the area of "Vektor" site. Modeling of Cs-134, Cs-137, Sr-90 and Pu-239+240 transfer from "Vektor" complex site is of high interest for substantiation of the data for the construction of RAW processing plant. The results obtained showed that radiation contamination of the site territory would not have any serious influence on the river Prypayt waters in the near future and that the geological environment has rather high protective barrier properties from radioactive contaminants. A series of other training tasks were solved.

Recommendations and Outlook. As a result of cooperative research with scientists from the USA, Russia and Ukraine we managed to implemented theMEPAS technique) in Ukraine. The implementation of MEPAS system allows us to lay a ground for environment protection measures within the Chernobyl Exclusion Zone. It can be used for student education, specialist training, and may help in scientific exchange between different countries.